

Device for inserting sticks into moulds for producing
confectionery on a stick

The invention relates to a device for inserting sticks into
5 moulds for producing confectionery on a stick. For the
purposes of this invention, confectionery on a stick should
be understood to mean any preparation consumable by
nibbling or sucking, for example made of sugar paste and/or
chocolate mass or in the form of ice cream, which is
10 connected with a stick for holding the preparation. The
stick may consist of various materials, for example wood,
rolled paper or plastics, and have a cross section which
matches the purpose, for example circular or rectangular.

15 The invention relates in particular to a device according
to the precharacterising clauses of claims 1 and 6. Such a
device is known from DE 39 19 324 A1. In said patent, the
rotary body takes the form of a turnstile, which comprises
two channels normal to one another and to the axis of
20 rotation of the rotary body, i.e. arranged in the shape of
a cross, in each of which channels a slide is guided. The
turnstile is rotatable in 90° steps, and the two slides are
driven in such a way, in adaptation thereto, that each of
them oscillates to and fro in its channel. Each of the two
25 slides carries at each of its two ends a rod holding bar, a
row of radial rods being attached to each of these rod
holding bars, which rods are each guided in a radial tube
of a row of tubes attached to the associated beam of the
turnstile. During each revolution of the turnstile each row
30 of tubes finds itself at one point opposite a feeder, by
means of which a stick is inserted into each of all the
tubes of said row radially from the outside inwards. After
rotation of the turnstile by 90°, this row of tubes is

positioned perpendicularly above a row of moulds, into which the sticks are inserted by a movement of the slide associated with their tubes. At the top of each row of moulds there is arranged a device whose job is to hold the sticks in position during solidification of the confectionery mass with which the moulds have previously been filled. This device consists of a pair of flaps, which are mounted on the top of the associated row of moulds so as to be pivotable towards and away from one another in the manner of tongs, being spring-loaded for pivoting towards one another and exposed to the action of an actuating device to pivot them away from one another. The two flaps are pivoted away from one another when the sticks are being inserted each into a mould in the associated mould row; then the two flaps are pivoted towards one another into their closed position, in which the sticks are each centred in a notch formed at the edge of one of the two flaps and clamped in place by the opposing edge of the other flap.

The above-described known device for inserting sticks is complex to manufacture and maintain. This is true on the one hand of the turnstile design, in which the number of rods required for pushing out the sticks is four times as great as the number of moulds present in each mould row. Considerable effort is also needed to arrange, control and keep clean during operation the above-described flaps cooperating in the manner of tongs on each row of moulds.

The object of the invention is to provide a particularly simple, compact and reliably operating device for inserting sticks into moulds for producing confectionery on a stick.

The object is achieved according to the invention by the features of claim 1. Advantageous further developments are revealed by claims 2 to 5. Furthermore, the features of claim 6 and of the further developments described in claims 7 to 9 have made it possible to provide a particularly simple device for inserting sticks into moulds for producing confectionery on a stick even when it has to be taken into account that the confectionery mass to be processed will not have solidified sufficiently when the sticks are inserted to ensure by itself that the sticks retain their centred, generally perpendicular, position in which they have been inserted.

The invention has the advantage of being structurally substantially simpler than the above-described prior art, so not only making it simpler to produce the device according to the invention but also most particularly to keep it clean. Thus, the number of plungers required in total to push the sticks out of the channels in the rotary body is only the same as the number of moulds per row of moulds on the mould conveyor. All that is necessary to keep the sticks centred in the moulds until the confectionery mass introduced beforehand into the moulds has solidified is a lid for each row of moulds, which is simple compared with the known tong arrangement and accordingly easy to clean. The effort required to produce and maintain the lid positioning, lid removing and lid return devices according to the invention is low particularly in the case of an installation with a plurality of rows of moulds in comparison with the previous need to provide each individual row of moulds with a tong arrangement with controlled actuation.

An exemplary embodiment with further details of the invention is described below with reference to schematic drawings.

5 Fig. 1 is a perspective view of a device according to the invention, in section in a perpendicular longitudinal plane.

Fig. 2 shows an enlarged portion of Fig. 1 from a slightly different perspective.

10 Fig. 3 shows an assembly from the right-hand area of the device in Figs. 1 and 2, once again from a different perspective.

Fig. 4 shows a portion of a side view in the direction of arrow IV in Fig. 3.

15 Fig. 5 is a partial view, again from a different perspective, of the assembly illustrated in Fig. 3.

Fig. 6 shows an enlarged portion of Fig. 2 in the area designated therein with the arrow VI.

20 Fig. 7 is a perspective view of the device according to the invention, corresponding to Fig. 1 but complete in parts and clarified by the omission of other parts.

25 Figs. 1 to 7 show a device which constitutes the essential part, according to the invention, of an installation for producing confectionery on a stick. The confectionery on a stick in the example illustrated is a ball of confectionery mass K, into which a stick S of circular cross section has been inserted radially.

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Figs. 1 and 2 show a horizontal portion of an endless mould conveyor 10, which comprises a plurality of moulds 12 arranged at uniform distances one behind the other and

which may be moved in the conveying direction indicated with an arrow a in steps in each case by the distance between two moulds 12. From the point of view of explaining the invention, the overall design of the mould conveyor 10 and the way the moulds 12 are connected together are of no significance; for example, the mould conveyor may comprise two parallel conveyor chains, which run over return wheels and on which the moulds 12 are suspended in oscillating manner. The invention is also independent of the detailed design of the moulds 12; in the example shown, they each have a central mould part 14, which is connected in articulated manner with a front outer mould part 18 and a rear outer mould part 18' by hinges 16 and 16' arranged across the conveying direction a. The central mould part 14 forms together with the front outer mould part 18 a row of for example ten front mould cavities 20 arranged next to one another across the conveying direction a, and together with the rear outer mould part 18' a corresponding row of rear mould cavities 20'. Over the portion of the mould conveyor 10 depicted, all the moulds 12 are closed; the mould cavities 20 and 20' each have an inlet opening 22 or 22' respectively arranged at the top, through which they have been filled with confectionery mass K in an area of the installation which is not illustrated but which lies to the left of Figs. 1 and 2.

The inlet openings 22 and 22' are relatively large, so that filling of the mould cavities 20 and 20' does not take much time and so that air pockets in the filled mould cavities are avoided. Because of their size, the inlet openings 22 and 22' are not in a position to hold the relatively slim sticks S in centred position when they are inserted into the confectionery mass K, which is still more or less

liquid and thus cannot provide sufficient resistance to tilting of the sticks. Provision is therefore made to ensure centring of the sticks S in that each mould 12, after its mould cavities 20 and 20' have been filled with confectionery mass K, is covered with a lid 24, which is positioned with a collar 26 surrounding it on the mould 12 and comprises centring holes 28 and 28' arranged to coincide with the inlet openings 22 and 22' of said mould 12, the cross section of said centring holes 28 and 28' being sufficiently closely conformed to that of the sticks S to hold them in centred position. The sticks S are thus each inserted through a centring hole 28 or 28' and an inlet opening 22 or 22' into the confectionery mass K in the relevant mould cavity 20 or 20' respectively.

For those sticks S which are assigned to a front mould cavity 20 there is provided a front storage container 30; those sticks S which are to be inserted into one of the rear mould cavities 20' are held ready, on the other hand, in a rear storage container 30'. The two storage containers 30 and 30' are identical to one another and the same is also true of the devices which are directly associated with one of these storage containers. Therefore, only the storage container 30 together with the associated devices will be described in detail below with reference to Figs. 3 to 5.

The storage container 30 is a rectangular box open at the top, whose width corresponds to that of the moulds 12, measured across the conveying direction a of the mould conveyor 10, and whose depth, as is clear from Fig. 3, is such that there is room in the storage container 30 for a supply of sticks 10 oriented parallel to the conveying

direction a. The sticks S each lie with one of their ends against a perpendicular container wall 32, which extends across the conveying direction a and delimits the working area of a tubular rotary body 34, which may be rotated
5 between the two storage containers 30 and 30' about its axis, hereinafter axis of rotation 36. The axis of rotation 36 is defined by a stationary shaft member 38, on which the rotary body 34 is mounted, with means of conventional type which are not illustrated, in such a way that an annular
10 space 40 is left substantially free between the rotary body 34 and the shaft member 38. The axis of rotation 36 extends horizontally across the conveying direction a. It is sufficient for the shaft member 38 to be attached on only one side of the mould conveyor 10 to a supporting
15 component, not illustrated, for example a rear wall of the device and for the rotary body 34 thus to be cantilevered. The advantage of this is that the rotary body 34 may be easily removed from the shaft member 38 towards the observer in Fig. 2 for cleaning purposes.

20 The rotary body 34 is circular-cylindrical on its inside and comprises on its outside, which was originally also circular-cylindrical, four stick holders 42 formed by milling or the like, which extend parallel to the axis of
25 rotation 36 and are arranged at angles of 90° relative thereto. Each of the stick holders 42 comprises two rows of channels 44 and 44', which correspond in diameter and arrangement relative to one another to the centring holes
30 28 and 28' of the lids 24. The channels 44 are each intended to receive one stick S, which will be inserted through one of the front centring holes 28 and the associated inlet opening 22 into one of the front mould cavities 20 of one of the moulds 12; likewise, the channels

44' are associated with the rear centring holes 28', inlet openings 22' and mould cavities 20'. All the channels are arranged substantially radially relative to the axis of rotation 36 of the rotary body 34; strictly speaking, the channels 44 and 44' of each individual stick holder 44 extend at a short distance from and parallel to a central plane of the relevant stick holder 42, in which the axis of rotation 36 lies.

According to Fig. 6, a spherical clamping member 46 is associated with each of the channels 44 and 44', which clamping member 46 rests, via a helical spring 47, against an adjusting screw 48 screwed into the relevant stick holder 42 and is prevented from becoming separated therefrom by a flange at the inner end of the adjusting screw.

The rotary body 34 is connected with a drive, not shown, for example an electrical stepping motor, which is coordinated with the drive, likewise not shown, of the mould conveyor 10 in such a way that the rotary body 34 in each case effects a quarter turn in the direction of rotation indicated by arrow b, i.e. in the anticlockwise direction in Figs. 1 and 2, while the mould conveyor 10 moves forwards in the conveying direction a by the distance between two successive moulds 12. After each of these movements, one stick holder 42 of the rotary body 34, pointing forwards, is located opposite the front storage container 30, so as to be able to take ten sticks S therefrom; the preceding stick holder 42 points perpendicularly upwards with the sticks S it has already taken, according to Fig. 1, without having any function in this position other than to hold said sticks firm. The

stick holder 42 preceding that one, pointing backwards, is located opposite the rear storage container 30', so that its channels 44' are provided with a second row of sticks S. The stick holder 42 preceding all three of the above-mentioned stick holders, pointing perpendicularly downwards, is positioned above one of the moulds 12 plus associated lid 24, which is ready to receive all the sticks S, twenty in the example illustrated.

As the bottom part of each of the two storage containers 30 and 30' there is provided a feeder 50 or 50' respectively; these two feeders are identical to one another, such that only the front feeder 50 needs to be described below with references to Figs. 3 to 5. The feeder 50 comprises a plate-shaped cross slide 52, which takes the form of the floor of the storage container 30 and at the same time may be moved to and fro in Figs. 3 and 5 parallel to the axis of rotation 36 of the rotary body 34 in the direction of double-headed arrow c by means of a piston/cylinder unit 54. The cross slide 52 extends to beneath the container wall 32 facing the rotary body 34 and comprises in its upper side parallel slots 56, open at the top, in a number and arrangement which matches that of the channels 44. When the cross slide 52 is in the rest position, each of its slots 56 is aligned with one of the channels 44 of the stick holder 42 facing the storage container 30, and thus also the associated feeder 50. Also when the cross slide 52 is in the rest position, a plunger 58 of an insertion device 60 is aligned with each of the slots, said insertion device 60 being movable to and fro in the direction of double-headed arrow d in Fig. 3 by means of a piston cylinder unit 62.

By moving the cross slide 52 to and fro one or more times, it may be ensured that one stick S from the supply contained in the storage container 30 enters each of the slots 56. When the insertion device 60 is subsequently
5 actuated, it is thus ensured that one stick S is inserted from each of the slots 56 into the associated channel 44 of the stick holder 42 pointing forwards at that moment. As is obvious from Fig. 6, the spherical clamping member 46 projecting into the relevant channel 44 is forced outwards
10 a little against the resistance of the associated spring, such that the inserted stick S is then clamped fast.

According to Figs. 1 and 2, the channels 44' also have each to receive one stick S; however, this happens only when the
15 stick holder 42 just mentioned finds itself opposite the rear storage container 30' after two further rotational steps of the rotary body 34. Fig. 6 shows clearly that all the sticks S ultimately received by the stick holder 42 are each prevented from leaving the rotary body 34 of their own
20 accord by a spring-loaded clamping member 46.

An ejector 64 is arranged in the annular space 40 within the rotary body 34 and comprises two rows of plungers directed perpendicularly downwards, namely one row of front
25 plungers 66 for each channel 44, and one row of rear plungers 66' for each channel 44', of the stick holder 42 which is directed downwards after the rotary body 34 has rotated one step. All the plungers 66 and 66' may be moved perpendicularly up and down in the direction of double-
30 headed arrow e by means of a common, for example electromagnetic, drive unit 68 supported on the shaft member 38. While the rotary body 34 is turning, the ejector 64 in each case adopts an upper end position, in which the

plungers 66 and 66' do not touch the rotary body 34; the piston/cylinder unit 68 is thus in each case only extended when the rotary body 34 adopts one of its rest positions according to Figs. 1 and 2, and when in addition it is
5 ensured that a mould 12 which has not yet been provided with sticks S, when necessary with associated lid 24, is ready precisely beneath the downwardly pointing stick holder 42.

10 If these prerequisites are met, all the sticks S, twenty in the example illustrated, contained in the downwardly directed stick holder 42 are each pushed downwards through a centring hole 28 or 28' and an inlet opening 22 or 22' into the associated mould cavity 20 or 20' respectively of
15 the waiting mould 12 by the plungers 66 and 66' of the ejector 64 penetrating into the channels 44 and 44' of said stick holder 42 with a single downward stroke of said ejector 64, and are ultimately ejected out of the channels 44 and 44'. As soon as the ejector 64 has then resumed its
20 radially inner rest position, the rotary body 34 may rotate on by one step.

If the consistency of the confectionery mass K makes it necessary for the sticks S each inserted into a mould
25 cavity 20 or 20' then to be held centred for a given time necessary for solidification of the confectionery mass K, the installation components described below are additionally brought into operation. These are substantially a lid positioning device 70, which is
30 arranged upstream of the rotary body 34 relative to the conveying direction a of the mould conveyor 10, a lid removing device 72, which is arranged downstream of the rotary body 34, and a lid return device 74, which extends

above the rotary body 34 parallel to the mould conveyor 10 and connects the lid removing device 72 with the lid positioning device 70. The lid positioning device 70 and the lid removing device 72 are of substantially the same design. The lid positioning device 70 is more clearly visible in Fig. 1 and in particular in Fig. 7; for this reason, the matching components of the two devices are provided with the same reference numerals and only the lid positioning device 70 is described in this respect below.

It comprises two paternoster-like arrangements, which are located one on each side of the mould conveyor 10 and each comprise a pair of bottom return pulleys 76 and a pair of upper return pulleys 78, over which run endless conveyor strands 80, for example V-belts, toothed belts or even chains. Associated conveyor strands 80 are connected together at uniform distances by lid supports 82, which may be simple angle sections. The lower return pulleys 76 of the two mutually facing paternoster-like arrangements are connected together by an angular gear 84 and have a common drive 86, for example an electrical stepping motor, which is synchronised with the drive of the mould conveyor 10 in such a way that, each time a mould 12 enters the area between the two paternoster-like arrangements of the lid positioning device 70, a lid 24 being held ready there on a pair of opposing lid supports 82 is deposited on the mould 12 and released in the process by the lid supports 82.

While the lid positioning device 70 is thus driven in such a way that it conveys lids 24 downwards from the lid return device 44, the opposite is true of the lid removing device 72. Upon removal from its mould 12, each lid 24 is drawn off the sticks S, twenty in the example illustrated, projecting upwards out of the inlet openings 22 of the

associated mould 22 and finally arrives, after several operating cycles, during which the same happens with the lids 24 of the subsequent moulds 12, at the top in the horizontal plane of the lid return device 74. The conveying
5 direction of the lid removing device 72 is thus the reverse of that of the lid positioning device 70.

The lid return device 74 comprises two parallel guide rails 88, on which the lids 24 may be displaced with a small
10 amount of lateral play from the upper end of the lid removing device 72 to the upper end of the lid positioning device 70. The return pulleys 76 and 78 of the lid positioning device 70 and the lid removing device 70, and accordingly also the associated endless conveyor strands 80
15 and lid supports 82 of these two devices, are arranged and synchronised with one another in such a way that, with each operating cycle, a pair of lid supports 82 of the lid removing device 72 carrying a lid 24 and a pair of lid supports 82 of the lid positioning device 70 not as yet
20 carrying a lid 24 but ready to receive one are simultaneously aligned with the two guide rails 88.

This situation is used by the lid return device 74 to displace the lids 24 located in its sphere of action by a
25 distance corresponding to the lid width. To this end, a horizontal frame 92 is attached at the top of posts 90 of the lid removing device 72, in which frame 92 a cross bar arrangement 94 may be moved to and fro in the longitudinal direction of the lid return device 74, i.e. parallel to the
30 mould conveyor 10, by means of a piston/cylinder unit 96 supported on the frame 92. With each displacement towards the lid positioning device 70, the cross bar arrangement 94 pushes the uppermost lid 24 conveyed upwards by the lid

removing device 72 off the lid supports 82, which have carried it thus far, onto the two guide rails 88. In this way, all the lids 24 which were already lying on the guide rails 88, are displaced in the direction of the lid

5 positioning device 70 by a distance corresponding to the width of the lids, the lid 24 that was furthest to the front in this direction of displacement so moving onto the waiting uppermost pair of lid supports 82 of the lid

positioning device 70. To limit the displacement, the lid
10 positioning device 70 comprises a pair of upper limit stops 98. The space adjoining these limit stops 98 becomes free again as soon as the lid positioning device 70 moves downwards by one step, in order to position the bottom lid 24 carried thereby onto the next free mould 12.